THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE case of Mrs. Kellum, widow of Mr. John Kellum, the late architect of the new Court House, New York, has been on trial for the last three weeks. The plaintiff brought a suit to recover three per cent, plus accrued interest, on the fair total cost of the building, minus such sums as were received by her husband during his lifetime, which amount to $84,502. The sum paid would be three per cent interest on a little over two million eight hundred thousand dollars. At first, the plaintiff claimed three per cent on the cost of the building as shown on the books of the city: in other words, she sued to recover about one hundred and seventy-five thousand dollars, plus accrued interest; for the books show that this building has cost the city more than eight millions of dollars. This position was relinquished during the trial, the plaintiff consenting that the cost of the building should be rated at four million three hundred thousand dollars; consequently her claim shrunk to something over fifty thousand dollars. The city contested the claim, on the plea that the ignorance and unskilfulness of the architect caused a dead loss to the city, of much more than the whole amount of the claim; that the ignorant misuse of iron beams of false form, and of iron where other material could have been used to better advantage, cost the city about four hundred thousand dollars more than was necessary. The Court charged the jury to find, in the first place, whether the honest cost of the Court House was more than two million eight hundred thousand dollars, on which sum the plaintiff's husband had already received three per cent as fee; and called attention to the statement of the defendant, that, at contract prices ruling during the time of building, it could have been built for two million two hundred thousand dollars. If the jury found that the building had legitimately cost more than the sum on which the architect had already received a percentage, they were to allow the plaintiff three per cent on the excess, unless they considered that the misuse and waste of the city's funds, caused by the ignorance and incapacity of the architect, destroyed any equitable claim on the plaintiff's part. If the jury took this view of the case, it must give a general verdict for the defendant, as the city had preferred no counter-charges. In charging the jury, the Court spoke with strong disapprobation of a man, who, feeling himself unfitted for the work, could consent to assume such a responsible position, and assert, by so doing, that he possessed the skill and knowledge requisite for the proper erection of the building. After long disagreement the jury gave a verdict for the defendant.

JUDGE SPEIR has at length secured the examination of the new Court House, New York, by inspectors appointed by the Health Department, who in the course of their investigations found that, though ventilating flues have been provided for removing foul air through openings near the the tops of the rooms, these flues, instead of all extending above the roof, in great part terminate in a large garret-room which has no outlet; that the air from rooms and passages is collected in the central hall of the building, which was to have been surmounted by the dome, but which is at present covered by the temporary roof in which no provision for facilitating ventilation has been made; that the air intended for renewing and purifying the atmosphere of the court-rooms is drawn from damp and unventilated cellars, and never from the outside of the building; that in winter this air is heated, before entering the rooms, by passing over coils of steam-heated pipes which are always covered by thick layers of street-dust, which, containing much organic matter, gives out when heated the most sickening and repulsive odors; and that even when unheated these dust-coated coils give off a most pungent odor.

IN view of these defects, the inspectors recommend that all the ventilating flues be continued independently above the roof, and that an ascending current be insured by keeping gas constantly burning at the base of each ventilating flue; that the air in the central hall be purified by raising the roof over it to such a height as to allow of a free entrance of air; that the vault lights on the first floor be removed, and the space occupied by them be left open; that the dirt be removed from about the steam coils, and the masonry so altered as to allow of ready access for the purpose of cleaning them when necessary; and that, instead of continuing to draw air from the musty cellars, measures be taken to obtain it from the outside of the building whence it can be had uncontaminated.

IN the year 1854 occurred an international competition for a Town Hall at Hamburg. The first prize was adjudged to Sir — at that time Mr. — G. G. Scott, the second to Mr. Meuron of Hamburg, and the third to Mr. Bohnstedt of the Imperial Academy of Fine Arts at St. Petersburg. The fact that the first and third prizes were given respectively to an Englishman and a Russian, proves that the competition had more than common right to be called international, and gives strong evidence of the impartiality and uprightness of the jury. Why the design of Mr. Scott was never carried out, we do not know; but it seems odd that the necessities of the city should not have so increased as to have rendered imperative the erection of a new town hall before twenty years had elapsed.

THE apparent impartiality with which the former competition was decided may possibly encourage American as well as English architects to take part in the new competition, the programme for which was issued a short time ago. The composition of the jury is such as to inspire every confidence in its abilities to judge fairly of the comparative merits of the designs submitted. Foremost among the members is Prof. von Lübke, the well-known writer upon German art; and with him are associated four architects of known merit and established reputations; the remaining four members are to be non-professional gentlemen, elected by the senate and town council. The designs for the Town Hall are to provide accommodation for the senate and town council, together with suites of reception-rooms for special occasions, guard-rooms, restaurant, &c. The site of the building measures about 338 feet by 221 feet. The cost of erecting the building must not exceed the sum of one million and a half dollars currency. Eight premiums of about twelve hundred dollars each are offered; the best design of the eight is to receive an additional reward of the same amount, in the case that it is not carried into execution. The length of time that would be consumed in obtaining from the Rathausbau-Commission, Admiralität Strasse, Hamburg, full instructions and particulars, will probably prevent most Americans from taking

part in this competition; for the drawings must be handed in on the first day of October next. Those who, in view of the dulness of building-affairs, are contemplating a tour on the Continent this summer, might spend a month at Hamburg, and thus combine business and pleasure.

PROMINENT among the architectural drawings at the exhibition of the Royal Academy is the drawing of the new National Opera House, a model of which has been lately placed in the rotunda of Drury Lane Theatre. Although the architect, Mr. Fowler, has modified his original design, it still bears a striking resemblance to the Paris Opera House of M. Garnier. The great change has been not so much in the design as in the material; since it is now to be built of Portland stone, and not of brick as was originally intended. The work of construction has already made good progress; and, although as yet no time is assigned for its probable completion, it is not likely to be as long building as was its Parisian prototype. The fireproof cellars, which cover about two acres of ground, have been built up to the level of the stalls. The ironwork is all finished and delivered, and the copper roof is even now awaiting the completion of the walls. This theatre, the auditorium of which is of the same dimensions as the famous La Scala at Milan, is said to be arranged more like an American or Australian theatre than in accordance with established English and Continental usages. The pit is to furnish five hundred and twenty-one spectators each with a separate armchair. Ninety-four private boxes, each with a separate antechamber, are provided, as at the Paris Opera House. Besides the numerous refreshment-rooms, smoking-rooms, and *foyers* common to all modern opera houses, other conveniences are to be introduced into the building, in obedience to the dictates of the laws which regulate social life in London. Chief among these conveniences are the dressing and bath rooms, which are to be provided with more than six hundred lockers. Gentlemen who are busy during the day in the city can here endue themselves with the full-dress costume without which no gentleman can be admitted to an English theatre, and be spared the trouble of a long cab-ride to their houses in another part of the city. There is to be a railway station in the building itself, and a sub-way is to connect it with St. James's Club and the Houses of Parliament: this suggests an increase of the difficulty that party leaders now have in keeping the members in the house when a division is to be called for.

CENTENNIAL ARCHITECTURE. — I.

IT is not to be expected that the architecture of a world's fair will have any great artistic or at least monumental value. If the buildings that we put up for it answer their purpose well, and are simply built in direct accordance with the purpose without violating good taste in their adaptation and without pretence, we need ask for no more. The great buildings of the Paris and Vienna Exhibitions showed how difficult it is to get architectural effect in such structures. The great buildings at Philadelphia are satisfactory just so far as they are the natural expression of their purposes: so far as they aim at monumental effect, they are failures.

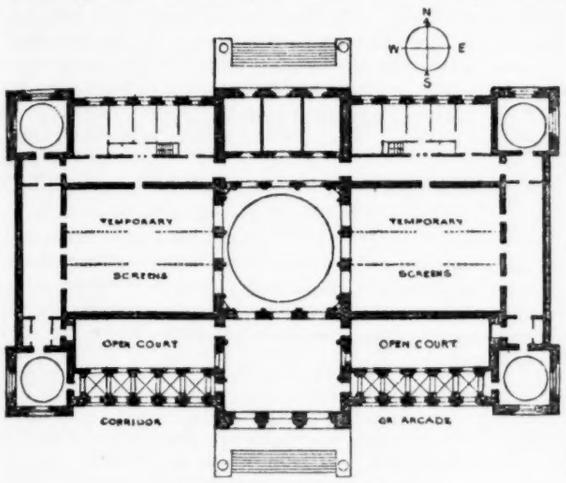
The arrangement of the main building is, as our readers may remember, very simple and straightforward. It consists of three long ridge-roofed aisles of nearly equal width (the middle one 120 feet, and the side ones 100 feet) and equal height (70 feet), intersected by a transept of the same triple section, the whole surrounded by a low aisle of 24 feet in width and height. This outer aisle is lifted at the middle of each of the four fronts into a high mass which screens the end of the centre aisle (nave and transept), and, containing the chief entrance, forms the leading feature of each façade. Over each corner of this surrounding aisle, is a tower 75 feet high. The central mass of the building is carried up above the nave and transepts, and has four corner towers 120 feet high. The whole is 464 by 1,880 feet, and covers twenty acres of ground. It has a basement of red brick diapered with black: the skeleton is of iron, but the visible exterior is of wood. This need not be objectionable; but the effort to give the building a monumental appearance has marred it. The triple arrangement of the structure is lost in the exterior; the central aisle, or nave, being covered by the frontispiece in the middle of each end, and the roofs of the side aisles so hipped back as to be unnoticed. The outline therefore is wholly rectangular in every part, yet too broken to preserve the commanding dignity of the square form. The eight towers are quite alike in treatment, square topped, and each with four pinnacles cased in sheet iron at the corners; and every central mass has twelve more of the same pinnacles. The entrances, marked by three high deep-arched windows with an arcade above and below, are not without dignity: yet the frontispieces that contain them, each of three rectangular steps with pinnacles at the angles, are uninteresting in shape; and the mass, which makes a sufficiently commanding centre for a façade of four hundred feet long, is inadequate for one of eighteen hundred. The color, too, of the building is disagreeable, hot, and staring, without either strength or richness, and needlessly broken up. This for the outside: the inside is much more agreeable. The simplicity and naturalness of the treatment tell well; the building looks spacious, and its height counts far more than its measure would lead one to expect. The general color up to the roof is a warm drab, relieved by red, buff, and blue. These colors are not very well harmonized except by distance, but are small in mass, and contrast well with the quiet tone of the roof, which is of light gray, and against which the slender lines of the iron trusses, in ochre tinted with red, melt into a pleasant airy neutral tint in the distance.

The view down the nave from the high centre galleries is very rich and striking, — a long confusion of rich color, stretching away interminably, it would seem, and relieved here and there by the overtopping mass of some high enclosure. The familiar black and gold of the French show-cases, and of many of the others, is a good foil to the color of the bright wares in and among them. It is a good thing that the upper part of the building is kept free from obstruction as it is, and the vista not broken by the hanging-out of stuffs and carpets, as it was at Vienna for instance. It would be a good thing, too, if the high enclosures and entrance-portals could be somewhat suppressed. They are, for the most part, ugly and pretentious, forestalling the attention, which ought to be caught by the wares behind them. Some of them, however, are agreeable, and are useful in the general effect by breaking up the level monotony of the cases. The Brazilian screen, for instance, designed in Moresque style, is prominent in the eastern nave, and, though a little rude in form and color, is very cleverly and effectively designed. The Norwegian screen at the western end, somewhat too conspicuous to be sure, is a good example to our builders of a restrained and effective though rather ornate wood construction.

The Machinery Hall, adjoining and in line with the Main Building, is essentially like it in plan; but is more distinctly a wooden building, and, being designed more simply and more in conformity with its structure and material, is more acceptable in its exterior effect. The color is quieter and therefore pleasanter.

The Art Building, or Memorial Hall, is of more pretension than any of the others, being massive and elaborate, built of cut granite, and meant to remain after the exhibition, as a permanent museum of fine arts, something like that at South Kensington. It therefore calls for more serious examination. It is a very large building, though its size will not tell till its gigantic neighbors are pulled away, — 210 feet by 365 feet, and covering an acre and a half of

ground. This large space, however, was ill arranged for the display of pictures, which were sent in such numbers that it was found necessary to add an "annex" of equal capacity, to contain them. In plan, it is substantially a Latin cross whose opposite arms are equal, formed of five large rooms,



PLAN OF THE ART BUILDING.

having the angles between the arms filled out to a rectangle with smaller galleries, and the corners marked by pavilions. The galleries on the north are subdivided into small cabinets; the building having its long fronts north and south, and facing south. On the south they are represented only by an open arcaded corridor or screen, behind which unroofed courts, planted as gardens, fill the angles between the arms of the cross. These courts are, for the uses of the building, thrown away; and, considering that it stands in the midst of the park, there seems to be no need of preserving them as gardens: it would not be strange if they were ultimately roofed over. Above the centre of the cross is a dome, square without and round within. The walls of the curtains are blank, or ornamented with niches; the halls and galleries are lighted from above; only the pavilion and the cabinets in the north are lighted by windows.

The style of the exterior is a more or less Italian Renaissance. The general ordonnance is simple and dignified, and the masses agreeably disposed, although the central dome is rather low for perspective effect. The leading lines are well preserved and accentuated; and the whole has a certain unity of aspect that is satisfactory. The time-honored forms of which the design is made up have their own dignity and character, which they retain through all uses. This is as far as praise will stretch. The hard and intractable granite, ugly in itself, of which the building is made, does not lend itself well to the working of the style in which it is executed, nor show it well when it is done. The detail of the work is spiritless and uninteresting to the last degree. When it is simple it is *mesquin*, and when it is rich it is pretentious and inelegant. The dome and the attic, which support it, are of sheet metal, probably galvanized iron, and look mean accordingly. The zinc statuary on the roof is clumsy and inelegant. Two winged horses which crown the buttresses of the steps, though not made for the building, — since they were cast for the Vienna Exhibition, we are told, and then rejected, or at least unused, — are quite in keeping with the clumsiness of the rest. The sixteen galvanized-iron eagles, which on the corners of the four pavilions seem struggling with their outstretched wings to lift the iron covers from the solid corner-piers, are in the same vein.

The interior is not more successful. The doming of the central hall is very singularly managed, and deserves notice. The hall is substantially square. The four corners are slightly truncated; but a shelf of flat ceiling projecting five or six feet from the wall covers the truncation and reduces the main cornice, which it bears, to a square. From the angles of this square cornice spring the pendentives, which carry a second and circular cornice; and on this rests the dome. The effect of this treatment is first to diminish the size and superiority of the dome; then the protrusion of the square shelf and cornice directly neutralizes the careful preparation for the junction of the walls with the dome, which is the *raison d'être* of the pendentives, and dislocates the whole structure, so that the dome, which is depressed in itself, instead of springing from the walls, seems to rest on the shelf like a round cover on a square inkstand, while the pendentives are lost in insignificance. It is difficult to imagine a motive for this curious treatment, which looks like a caprice pure and simple. It is possible nevertheless, that there is some structural reason for cutting off the corners to the hall, which seems to be the key to the whole arrangement. The interior ornamentation of the building is not better than the exterior, and being more abundant is more disagreeable. Both stucco and woodwork are overdone, and lack spirit and refinement. It is a great pity that a building so important and so prominent, a permanent and in its way representative work, the only serious piece of architecture which the Centennial presents, and a good conception withal, should be so marred by want of study, or skill in carrying it out.

The "annex" to the Art Building is a very plain structure, and furnishes a pleasant maze of perfectly uniform rooms forty feet square, intersected by two corridors at right angles. It is in plan much like a pier from a late Romanesque church, the responds being pilasters instead of shafts. Outside it is a shapeless mass of ins and outs, with no windows, a perfectly horizontal cornice and flat roof, on which stand, apparently, forty high and ugly truncated pyramidal skylights, over the forty rooms inside. This building, which in the language of the catalogue "harmonizes architecturally with the Memorial Hall," — that is, it is ornamented with arched panels and a cornice of the Renaissance, — is of brick, stuccoed and painted in imitation of granite. We are sorry to say that it is proposed to make it a permanent building. It is not easy to think it was built with that intention.

THE BEARINGS OF THE PROPERTIES AND FUNCTIONS OF BUILDING-MATERIALS AND OF MOISTURE IN THE GROUND ON DAMPNESS IN OLD AND NEW DWELLINGS. — II.

READ BEFORE THE NINTH ANNUAL CONVENTION A.I.A., BY ADOLF CLUSS, FELLOW.

THE cementing materials which play a prominent part, especially with artificial stones, require moisture in order to exert their binding power; and this moisture must hold out for a certain length of time, so as to effect a gradual hardening of the binding material. This is of great importance with lime-mortar, but still more so with cement-mortar. Any stone which enters into combination with mortar has to be, primarily, porous; and to this attaches a certain hygroscopic property, i.e., a property of absorbing and discharging moisture according to circumstances. Consequently, when brickwork is put up, a too-dry brick will abstract considerable moisture from the mortar in which it is laid. The mortar hardens only as far as the moisture retained by it admits; for the rest, it remains mortar-powder, which has no technical value. The brick, however, retains the moisture it has absorbed until it is caused by external heat to part with it by evaporation. Bricks being bad conductors of heat, this occurs in the external air principally in hot summer days; in the interior of a building, it goes on after it is occupied and warmed.

Before proceeding any further, it is important to recall to mind exactly how the union between stones and mortar is established. There is a vital difference between the use of common or fat lime, and of cement, for making mortar. Lime for air-mortar is obtained from a limestone which consists almost wholly of carbonate of lime. This, when calcined or burned in the kiln, loses in the average forty-four per cent in weight, or fifteen per cent in volume,

in the shape of liberated carbonic acid and water, and forms quick-lime. The quick-lime is slaked into a paste containing about forty per cent of a chemical combination called hydrate of lime, and sixty per cent of water as a mechanical admixture. During the process of slaking, it swells to about three times its original bulk, while hydraulic lime swells only about half as much. In both cases it becomes very hot, and falls to powder. This pulpy mass being united with sharp sand for the formation of air-mortar, a compacting of the substances takes place again, since one volume of slaked lime and three volumes of sharp sand give but two and one-half volumes of mortar. This occurs in consequence of the absorption of carbonic acid, found between the particles of sand, by the lime contained in the hydrate, in which process carbonate of lime in small quantities is formed. These are the phenomena occurring in the formation of mortar. When mortar in a semi-fluid state is spread between the building-stones, a solution of the slaked lime penetrates into the pores of the stones. Independent of the sudden imbibing of water by the porous hygroscopic stone, which must be avoided as much as possible, a closely adhering secretion is formed from the slaked lime which binds with the walls of the pores of the stones; and this comes to be the cause of binding the stones strongly together, while the whole mass of mortar in the joint hardens during the slow evaporation of the water. The hardening of the slaked lime is produced by the gradual absorption of carbonate of lime so reconstituted. The slower the transformation of the hydrate into the carbonate proceeds, the better for the ultimate hardness of the mortar. An exterior hardening of the mortar having thus been effected, and a sufficient amount of moisture still remaining enclosed, a second but very slow process is believed to go on with particles of the sand, namely, the formation of silicate of lime; and this would contribute also to the strength of the masonry. The process of hardening of cement-mortar is essentially different from that of common lime-mortar. A fit material for burning to obtain natural cement is a stone in which carbonate of lime and silicates exist in such proportions, that, when the carbonic acid is expelled, the lime is exactly in the proportion required to make a hard compound with the silica and alumina. Cement in marketable state consists of a mechanical mixture of quicklime with silicate of alumina. These elements are indifferent in a dry state: still they have an intimate affinity for each other, provided there is a favorable opportunity for them to combine. This can but be done in a liquid state; and, as soon as the cement is made into a paste with water, chemical action takes place. On one hand, hydrate of lime is formed; on the other, by the solution of the alkalies, hydrates of silica and alumina; and these combine at once, after a considerable evaporation of water, into a double silicate of alumina and lime which forms a compact artificial stone. Thus it appears, that, with lime-mortar, the formation of carbonate of lime is primarily effected, and silicate of lime is formed but slowly and in small quantities: while with cement-mortar the inverse is the case; silicate of lime is first formed, and the subsequent slow formation of carbonate of lime is of but secondary importance. Lime with more or less hydraulic properties stands between both, being a mixture of quicklime with silicate of alumina, iron, magnesia, and so on, which under water forms an artificial stone consisting of compound silicates of lime, alumina, and other bases. Still it contains a greater or less surplus of lime beyond that which is capable of combining with the silica and alumina; and this retards the hardening. The longer the hardening of the cement-mortar continues, the more opportunity its alkalies find for solution: this being favored under water, the propriety of using cement in presence of moisture becomes apparent. The function of sand in dry mortar is mainly to keep apart the particles of slaked lime so that the air which is necessary for the hardening has due access to them. Still this state of merely mechanical admixture assists in the end in the formation of a quasi-artificial sandstone. In the hardened mortar, the grains of sand are embedded in a matrix of carbonate of lime or of silicate of lime. The sand also increases the resistance of the mortar to crushing, and with lime mortar lessens the amount of shrinking and consequent tendency to crack during the drying of the mortar; it also saves expense by diminishing the bulk of the more costly materials required to fill a given joint in the masonry.

On the other hand, the admixture of sand diminishes the tenacity of the mortar. If excessively used, it makes the mortar brittle. The purer the lime, the greater proportions of sand it will bear. As the hydraulic qualities of the lime increase, the admixture of sand will generally have to be diminished. Dry-rot in lumber, and the decay of stones in walls, have been staple subjects for commentators; but it is the close attention paid to the principles underlying substantial work, and the investigation of local causes, that alone will avail; just as for the occupants of the houses there are no quack medicines applicable in all cases. The quality of the lumber, as well as the manner in which it enters into the construction of houses, is of importance. Green lumber is preferable for foundations, wherever its use cannot well be dispensed with for the purpose, and then it should be kept permanently wet; but, in using lumber above the foundation, best seasoned material should be selected, and care taken that any moisture still contained in it may evaporate by means of an air-space at each end of it. The most experienced carpenter can hardly vouch for a joist of the growth of which he knows nothing, since he bought it ready cut to dimensions. The capacity of air for carrying suspended aqueous vapors increases with its temperature. When walls, apparently well dried, again show signs of dampness after occupancy, this is caused by deposits of water from the air. The walls have lost so much of the water primarily necessary for sound construction, that their pores at and near the surface are filled partly with air which produces the optical impression of dryness; but, this being a mere surface process, not much is required to turn the scales again. Man develops by his person and by household operations, such as washing, cooking, scouring, &c., much aqueous vapor: this fills the air with water to its full capacity according to temperature; and a slightly lower temperature of the wall is sufficient to cause a deposit of these aqueous vapors thereon, just as dew settles on panes of window-glass. Glass cannot imbibe any condensed water, while porous walls can, as is evidenced in old buildings where the windows may be covered with thawing vapors while the inner walls appear to remain dry. Salts contained in inferior materials are dissolved under such circumstances; they infect the lumber, and after a few years often cause dry-rot and the characteristic smell peculiar to the process of decomposition. Into a well-built house nearly a pound of water enters for every brick which is sufficiently wetted and solidly laid in mortar; this gives fifty tons of water for a moderately sized house containing one hundred thousand bricks. Most of this is merely mechanically admixed: the water, chemically bound during the slaking of the lime, being hardly more than five per cent of the whole quantity. About ninety-five per cent of the mechanically admixed water must be removed again before a dwelling is fit for occupancy; and this is done exclusively by evaporation. The capacity of the atmosphere to absorb water is dependent upon the tendency of water to evaporate at different temperatures, also upon the quantity of water contained in the air passing over a moist body, and upon the velocity with which the air moves. The difference between the amount of moisture actually contained in the air at the time, and the full amount which it is capable of carrying, will hence be the limit of the service it is in making a building ready for occupancy. If the season or weather are unfavorable, the quantity of the air must be increased by moving it, and its condition must be improved. This is done by protracted airing and heating before occupancy. By heating we increase the capacity of the air to extract moisture from the green walls. Once fully charged, the drying process would stop if the air should be allowed to stagnate; but, by airing, we change the whole body of air constantly, and enable the redeeming process to be steadily repeated. This is the only substantial way of drying new buildings.

THE ILLUSTRATIONS.

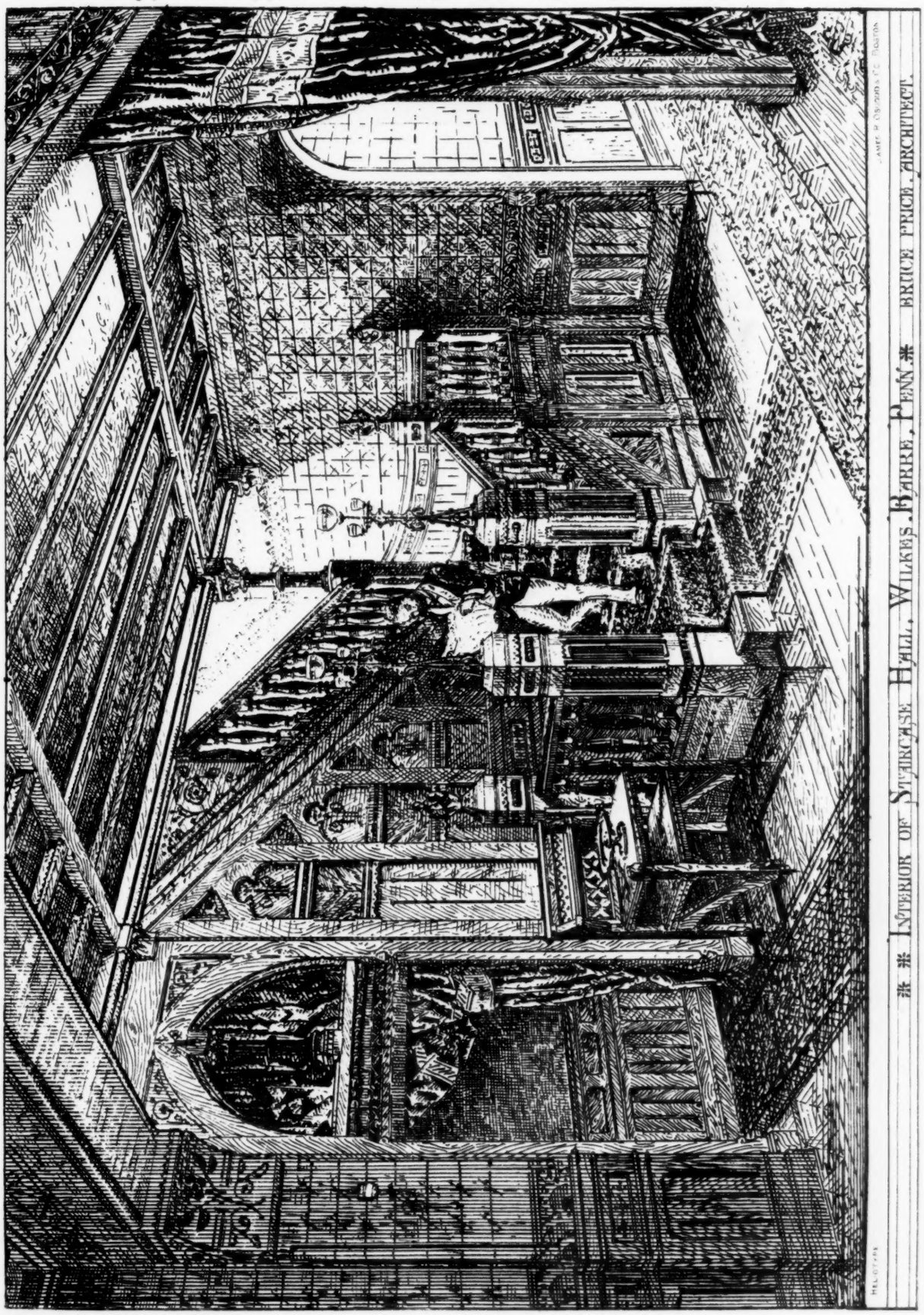
STAIRCASE HALL OF THE HOUSE OF GEO. S. BENNETT, ESQ., WILKES BARRE, PENN. MR. BRUCE PRICE, ARCHITECT.

THIS is an interior perspective of the staircase hall in the residence of Geo. S. Bennett, Esq., an exterior view of which appeared in No. 17 of the American Architect and Building News. It is finished in walnut, with panels of dark red cherry; and the walls are colored with stencil patterns in distemper.

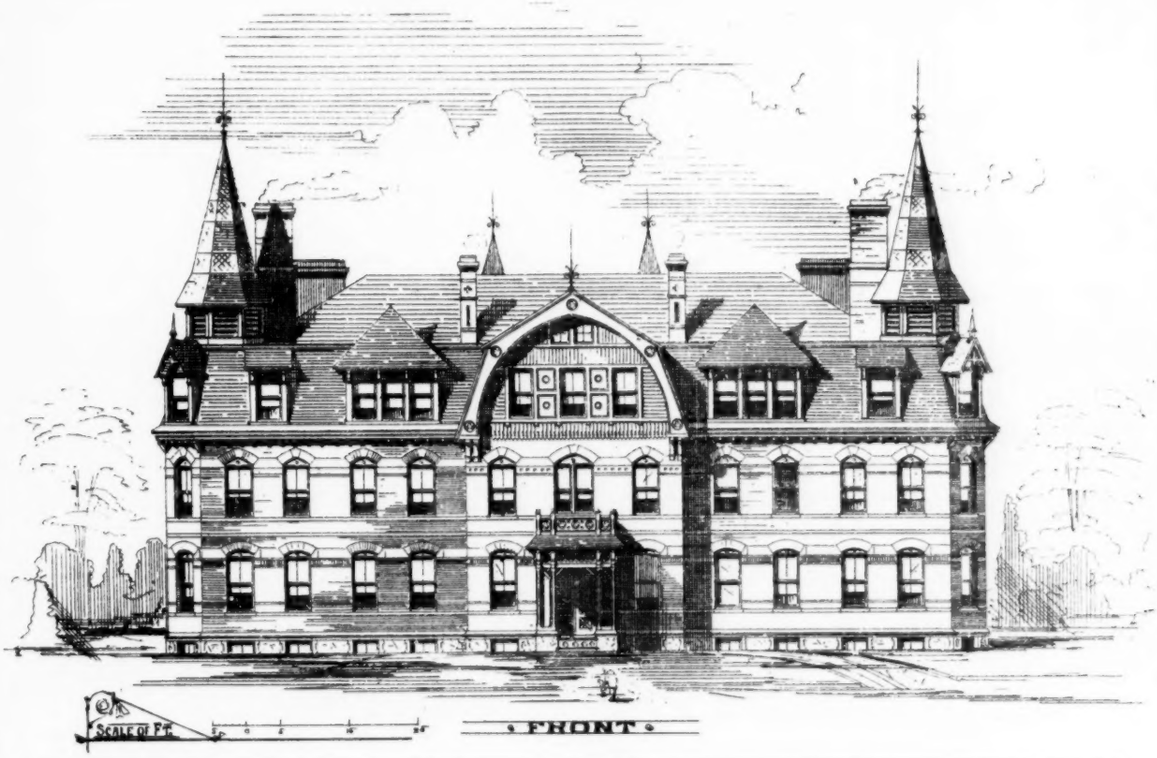
THE NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN, ROXBURY, MASS. MESSRS. CUMMINGS AND SEARS, ARCHITECTS.

These buildings, situated on Codman Avenue, Roxbury, were completed and occupied in 1872, and consist of the large brick building shown in the drawing, a "maternity cottage" for the lying-in wards, and a laundry.

The large building measures 122 feet long and 55 broad, and furnishes accommodation for about forty-five patients. It was built at a cost slightly exceeding $50,000. The maternity cottage is a wooden building measuring about 43 x 58 feet on the ground, one story in height, with a Mansard roof, and cost about $10,000.

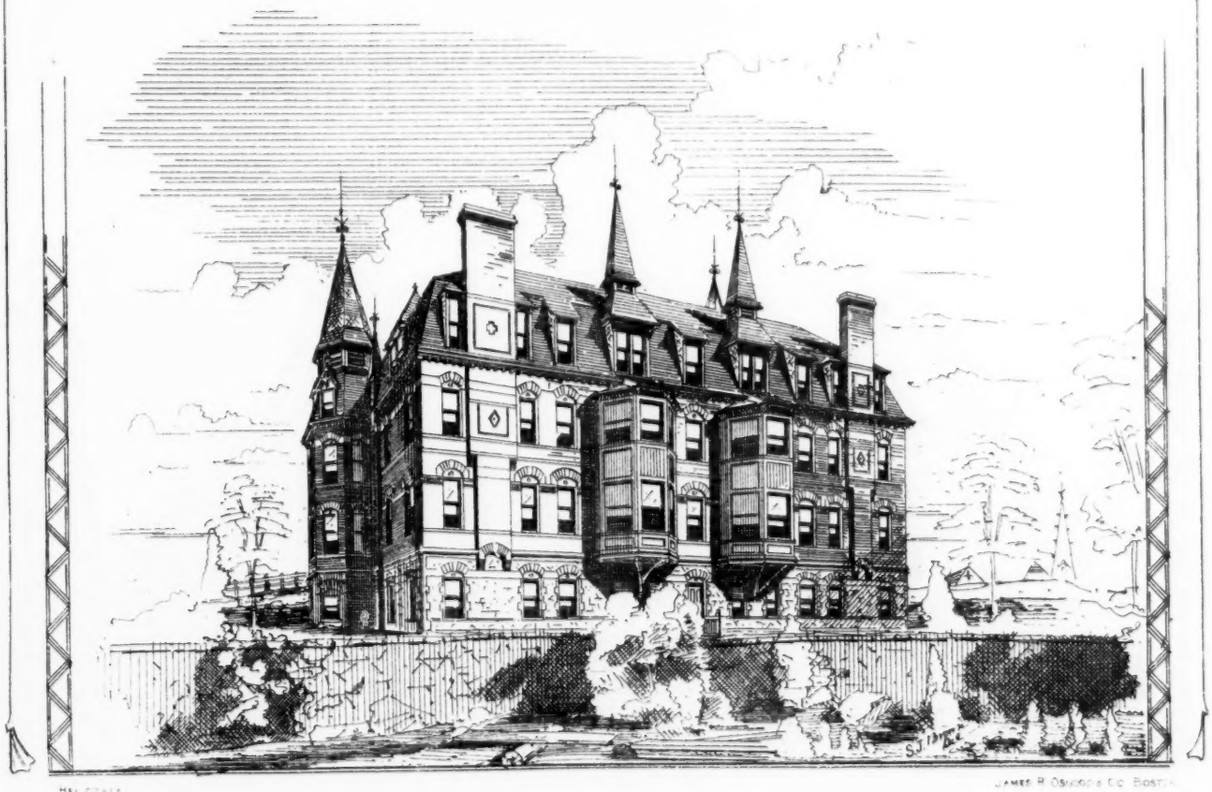


* * INTERIOR OF SYDENHAM HALL, WILKES-BARRE, PENN. * BRUCE PRICE, ARCHITECT.

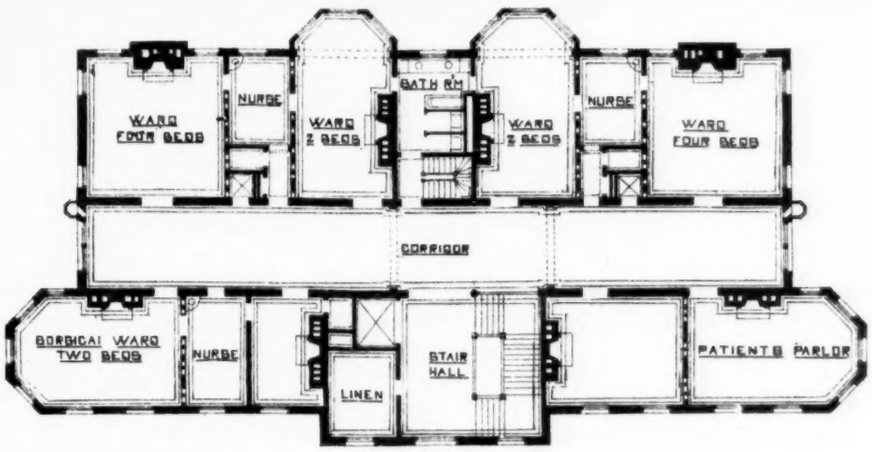


NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

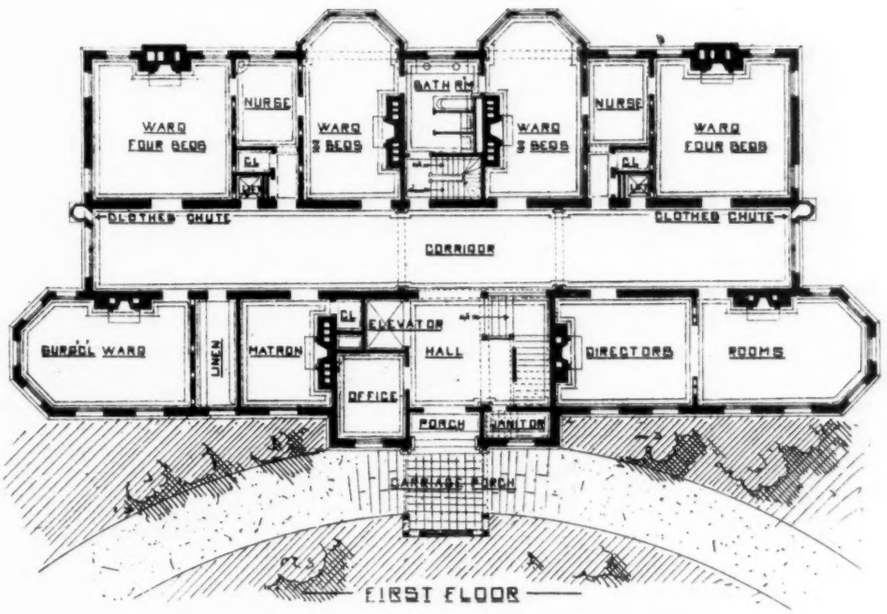
CUMMINGS & SEARS, ARCHT'S. BOSTON, MASS.



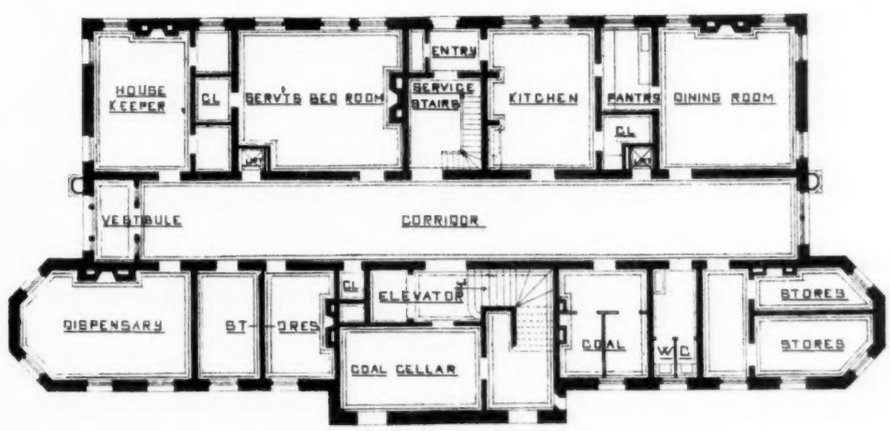
HELIOTYPE. JAMES R. OSGOOD & CO. BOSTON.



SECOND FLOOR



FIRST FLOOR



BASEMENT

"NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN"

BOSTON

SCALE FT. 1 0 4 8 12 16 20 24 32

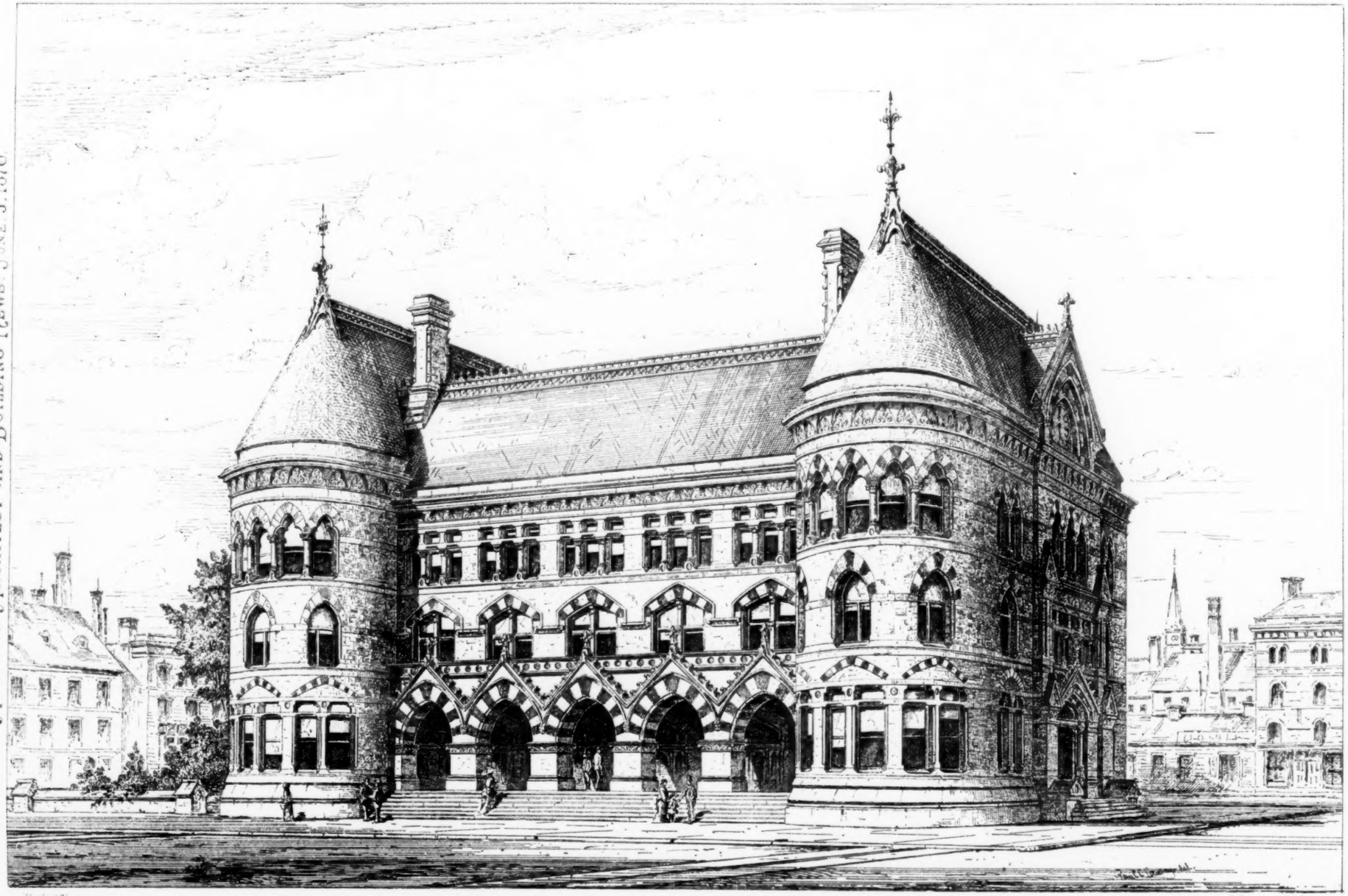
CUMMINGS & SEARS ARCHITECTS
3 PEMBERTON SQ BOSTON.

U.S. CUSTOM HOUSE AND POST OFFICE.

FALL RIVER MASS.

WM A. POTTER SUPERVISING ARCHITECT TREASURY DEPT

American Architect and Building News. June 3, 1876



U.S. CUSTOM HOUSE AND POST OFFICE.

FALL RIVER MASS.

WM A. POTTER SUPERVISING ARCHITECT TREASURY DEPT

It has beds for about fifteen patients. The finish of both buildings is simple, all interior finish being of soft pine.

U. S. CUSTOM-HOUSE AND POST-OFFICE, FALL RIVER, MASS. MR. WM. A. POTTER, SUPERVISING ARCHITECT, TREASURY DEPARTMENT.

The exterior walls of this building are to be of gray granite, rock face, with cut trimmings of red and gray granites. The first story is to be occupied by the Post-Office. The upper stories are to be used for the Custom-House and other Government offices. Estimated cost, $337,000.

DESIGN FOR THE CHURCH OF THE ADVENT, BOSTON, MASS. MESSRS. STURGIS AND BRIGHAM, ARCHITECTS.

This description was received too late to be inserted in our last issue with the design described.

The church lot is on the corner of Mount Vernon and Brimmer Streets, containing about 18,651 square feet. It is in shape like the mainsail of a sloop: the part next the mast, and which is at right angles with Brimmer Street, measuring 119 feet; the gaff, 93 feet; the boom (on Brimmer Street), 169½ feet; and the outer edge, on Mount Vernon Street, 185 feet. On this it is proposed to build the church, a clergy-house, and schools, covering nearly the entire lot. The illustration shows the west front of the church, facing Brimmer Street, the building at the left being the clergy-house, and that at the right the Sunday school. The nave is designed to be 30 feet in width, 52 feet in height to the wall-plate, and 75 feet to the apex of the roof inside. The tower is to be 24 feet square at the base, and 170 feet in height. The material is to be brick inside and out, with belts and sill-courses of stone and terra-cotta.

PRACTICAL OBJECTIONS TO THE METRIC SYSTEM OF WEIGHTS AND MEASURES.

THE committee appointed by the Franklin Institute of Philadelphia to report upon the communication addressed to the Institute by the Boston Society of Civil Engineers with reference to the adoption in this country of the metric system of weights and measures, have presented their report. After giving a detailed account of the confusion in the system of weights and measures that existed in France prior to the introduction of the metric system, and after relating the difficulties attending the introduction of the system into France, the report proceeds as follows:—

But, whatever were the controlling reasons which incited the opposition to a change in France, they have much greater force with us from the absence of motive. We have no such confusion and diversity as the French had, and no such reform is called for. Our money is already decimally divided, and we enjoy already the chief benefits which the new system gave to the French.

If the measurements of the weights and the dimensions of substances, when ascertained, were only to serve as data for complicated calculations, the reasons for adopting weights and measures decimally divided would have controlled the practice long ago. This is actually the case with us in surveying land, which is measured by chains twenty-two yards long, divided into a hundred links; in civil engineering, when embankments, excavations, &c., are measured by yards and tenths, or feet and tenths, as the case requires; in the measurement of ships for tonnage, when the three dimensions are taken by feet and tenths; and in gauging casks, which is done with a gauging-rod marked in inches and tenths.

But the fact is, that the vast majority of weighings and measurings are followed merely by mental calculations, or by a simple multiplication of quantity (whole or fractional) by price (in decimals), a process which can oftener be done by vulgar fractions more easily than by decimals.

The metre is really as arbitrary a standard as the foot. About eighty degrees of latitude have been measured; but no two of them have been found of the same length, and there is good reason to believe that the length is not permanent in the same place. The only real thing about it is the rod in the public archives. The length of the metre is to be recovered, if lost, by comparison with the length of the seconds pendulum; and so likewise is the length of the foot or yard.

The metre was adopted in France for the lineal unit, in pendulum, only because the harmonious proportion between the metre and the length of the meridian would bring all local measurements into harmony with the measurement of the world, and would be a great assistance in geography and navigation; but the decimal divisions of the quadrant and of time having been abandoned, and the adopted length of the metre having been found incorrect, there remains not even a sentimental reason for adopting it as our unit of measure. Our own convenience should be our guide; and overwhelming reasons forbid us to incur the confusion, labor, and expense of attempting to make a change of that kind.

In the opinion of your committee, the metre in any shape heretofore adopted is a less convenient instrument for measurement than a two-foot rule. You cannot fold it into four without breaking the sub-units. If so folded it would be ten inches long, which is inconvenient for the pocket. The metre is only decimally divided, whereas the foot-rule, beside being divided into tenths and hundredths, is also divided into twelve inches, and gives the even $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{10}$, $\frac{1}{12}$, and $\frac{1}{100}$ of the foot, and the $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{1}{10}$, $\frac{1}{12}$, and $\frac{1}{16}$ of the inch.

By changing our unit of lineal measure for the sake of uniformity with France, we should sever our uniformity with Great Britain, a country with which three-fifths of our foreign commerce is transacted.

The change in our units would entail much greater expense than is usually imagined. The measurements of every plot of ground in the United States have been made in acres, feet, and inches, and are publicly recorded with the titles to the land, according to the record system peculiar to this country. Hundreds of years would elapse before we could permit ourselves to forget these old measures. Beside this, the industrial arts during the last fifty years have acquired a far greater extent and precision than were ever known before. Take, for instance, the machine-shops, in which costly drawings, patterns, taps, dies, rimers, mandrels, gauges, and measuring tools of various descriptions for producing exact work and repetitions of the same with interchangeable parts, are in common use.

It has been calculated, that in a well-regulated machine-shop, thoroughly prepared for doing miscellaneous work, employing two hundred and fifty workmen, the cost of a new outfit adapted to new measures would not be less than a hundred and fifty thousand dollars, or six hundred dollars per man. If, instead of changing the sizes, we adopt the alternative of giving the French dimensions to the old sizes, the irreconcilable discord between the inch and the divisions of the metre would furnish a precious example of the simplicity of the decimal system.

If new weights and measures are to be adopted, all the scale beams in the country must be regulated and re-adjusted; the thousands of tons of brass weights, the myriads of gallon, quart, and pint measures, and of bushels, half-bushels, and peck measures, and every measuring rule and rod of every description throughout the land, must be thrown aside; and others, which the common mind cannot estimate, must be substituted.

The great mass of English technical literature would become almost useless, and must be translated from a language which we, and the nation we have most to do with, understand perfectly, into a new tongue which is strange to most of our people. As a question of cost, let those who advocate this change consider it carefully.

To the teacher, to the closet scholar, to the professional man, to those who never handled a rule or a measure, but only use weights and measures in calculation, it may seem merely a matter of legal enactment; but to the worker, the dealer in the market-places, to those who produce the wealth and prosperity of the land, the question is a most serious one.

The Franklin Institute has never placed itself on record as opposing true progress: it has always advocated changes which were beneficial and not destructive. In this case a majority of your committee believe that the ultimate benefits of the change proposed would be of less value than the damages during the transition. They think that the Government of the United States has already done all that can fairly be asked of it by the most enthusiastic advocate of the metrical system, by making it legal. Those of us who choose to do so can use that system, and no one can object to it; but, for the Government to require us to use that and no other would be an arbitrary measure which we are neither willing nor able to bear.

The majority of your committee are of opinion, and so report, that the objections to the attempt to adopt the metre as a standard unit of lineal measure, are overwhelming, whether we consider the compulsory means proposed, or the end to be attained.

All of the objections to the metric decimal system do not apply to the adaptation of the decimal scale to our existing units. In the decimal harmony between the cubic foot and contents of water weighing a thousand ounces avoirdupois, whereby a cube of one-tenth of a foot on the edge becomes the measure of the ounce of

water, we have the means of constructing a decimal system of weights and measures which would interfere the least with existing institutions. But your committee do not feel called upon to consider this branch of the subject.

ARCHITECTURE AT THE ROYAL ACADEMY.

LONDON.

SINCE the closing of the Architectural Exhibition in Conduit Street, the annual display of drawings at the Academy is the only opportunity of judging of the progress of architecture by means of an exhibition, which is now left to us. What was held to be an open question — whether the interests of architecture are better forwarded by a yearly collection of drawings relating to it only, or as part of a general exhibition in conjunction with its sister arts of painting and sculpture — seems to have settled itself. From want of adequate support either from the profession or the public, or both, the architectural exhibition pure and simple has died out; and we now depend on the very small portion of its space which the Royal Academy devotes to architecture, for a pictorial record of the year's passed or proposed work. Even this small allowance of space has its opponents; some painters declaring that it is simply thrown away, and the architects had better be turned out of the Academy altogether. There is little likelihood, however, of such unwise counsel prevailing, considering that of the members of the Academy, — especially in the class of associates, — the architects who have the honor of writing "R. A." and "A. R. A." after their names are, as "artists," probably stronger in their own profession than any similar number of men in the other branches of the "arts" which go to make up the Academy. Indeed, the two latest additions to the associateship are so strong that the men recently elected to that class will have to study very hard indeed to hold their own with their architectural comrades; and, as regards that recent election also, it might fairly have been claimed, that when four associates came to be chosen, instead of electing three painters and one sculptor, one of the painters might have been left out, and an architect put in his place. Considering that we have among us at the present time several architects of a very high standing as "artists," this would not only have been a fairer division of the honors, but, without any prejudice to the painters, would have probably strengthened the Academy as an artistic body very much more than the new "A. R. A's." have done. It is to be hoped, that, when the promised extension of the associateship in the matter of numbers takes place, a little more justice will be shown to architecture.

Passing, however, to the more pertinent question as to how the architects have supported their department in the Academy's exhibition, it must be confessed they have not done as they might, or ought to do if they mean to maintain its importance. We miss many well-known names from the catalogue, who are known to have been doing highly artistic work, not only this year, but for several years past. Taking this year's productions, though there are several strong names, it will be sufficient to mention such men as Nesfield, Bodley, Gilbert Scott, jun., Butterfield, Burges, Godwin, and others, as non-exhibitors, to show how very much stronger architecture might be made at Burlington House if more of our leading architects supported it by their works. It may be said, there is not sufficient inducement for them to waste time making show drawings. That saying, like many others, is open to doubt. Architecture, like other matters connected with art, has greatly advanced of late in a purely artistic sense. More people take an intelligent interest in it, and endeavor to understand it: especially so is this the case among artists themselves, with whom house-building has become a fashion. So long as architecture is to be represented at the Academy, so long will it be the duty of the profession to support it to the best of their ability. When the Academy moved into Burlington House, great things were promised: architecture was to have a room to itself; now it is relegated to half a room, and that a small one. Architects have not come forward as they might have done, though the election of Mr. Shaw and Mr. Pearson as associates proves that the Academy as a body is not slow to recognize and do honor to artistic work such as these gentlemen have long been noted for. A year or two ago, also, it was generally understood that drawings by architects themselves, instead of being prepared in their offices, would have a certain preference and encouragement. This was supposed to come from the influence of certain architectural members of the Academy who are noted for their draughtsmanship; but it is undeniable that there are some architects who are equally well known as draughtsmen, not to speak of their great powers of design, who never send drawings at all. Still it must be confessed that the number of designs shown in drawings by their authors' own hands is on the increase: the best works of this year are probably such; and it is to be hoped that every succeeding exhibition will increase their number. It is a healthy sign, when a man can not only design but draw out his own work. We are much more likely to have it good and healthy when such is the case; and it is more than a pleasure to notice that men whose work must press them very hard for time can still find enough of it to keep up the good practice, and show us that their hands have not forgot their cunning. It is encouraging also, to notice that this year's exhibition shows steady progress in design as well as in drawing. There are more works well above mediocrity than below it. The domestic element is particularly strong: we have almost every phase of an English house, large and small, for town and country, and in all sorts of material, from severe stone to half timber and plaster work. Public buildings and churches are not very numerous; but these few are fairly good, while in two or three instances to be presently mentioned a very high order of merit indeed has been attained, giving the latter class of work the preference. Among churches will be found, in the place of honor in the room, the new nave Mr. Street has recently added to Bristol Cathedral; this noble design is shown by admirable geometric drawings consisting of plan, elevation, and sections. It is in every way worthy of its author, and thoroughly in keeping with the old work of the cathedral, very English in feeling and masterly in treatment, especially so in the case of the west doorway inside and out, the groining of the nave, and the north porch, all beautiful features in themselves, and full of carefully studied detail. In this, Mr. Street's only contribution, he is well represented. His work is artistic and scholarly as it always is, and has a fitness for its purpose which commends itself at once: it shows his intimate acquaintance with the requirements of ecclesiastic art, and the consummate knowledge he brings to bear on the subject. His brother Academician, Mr. G. G. Scott, sends in two drawings. His design for the "proposed new church at Milton," Worcestershire, is a very good typical English country church, with all the well-known features. It is in the decorated period of Gothic, and is characterized by that careful study of detail and proportion to be found in Mr. Scott's work; the west tower and spire looks more like old work, particularly about the belfry stage, than in some of his recent churches; it has also that leaning to lateness of style which is noticeable in the best church work being done just now. The exterior is, on the whole, better than the interior, the wood groining being somewhat unsatisfactory, and the screen across the chancel arch poor in design. It is to be hoped, however, that Milton will soon become possessed of such a thoroughly good church.

THE HOUSE-DRAIN QUESTION CONTINUED.

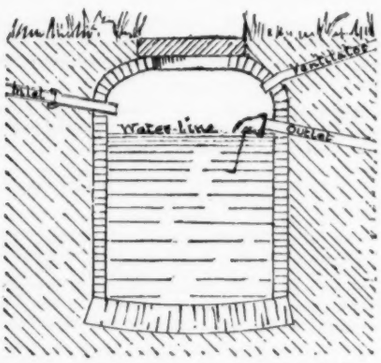
THE final disposal of house-drainage is in every way a serious matter; and it practically makes less difference than is generally supposed, whether the water to be got rid of is only the kitchen waste, or the whole offscourings of a house with complete plumbing appliances. What we have to deal with, in both cases, is the organic matter that has been brought into the house, as food, &c.; and whether this matter has passed through the additional process of digestion, or not, does not materially affect the results of its final decomposition after its removal. The only added danger, when water-closets are discharged through the drain, arises in the case of excreta from patients ill with such diseases as typhoid-fever, cholera, diarrhœa, &c. Practically it is no more safe to make a careless disposition of the waste from a small kitchen than from a whole house with complete water-works.

If the house can be brought into connection with a public sewer, this course will naturally be followed; and the sanitary questions arising are dependent, very much, upon the condition of the sewers, the discussion of which would be out of place here. In those cases where there is no public outlet, the question of the disposal of liquid wastes becomes extremely serious.

It may be set down as an invariable rule, applicable to almost all conditions, that it is never safe to allow household wastes to accumulate in leaching cesspools, from which their liquid is constantly oozing into the soil, with the danger that it will reach wells or cellars, or that it will accumulate in the earth beyond the capacity of this to disinfect and decompose its filth. If there is no land about the house, and no sewer for discharge, the only safe plan is the very inconvenient and costly one of accumulating the whole liquid in an absolutely tight and thoroughly ventilated cistern, to be pumped out as occasion requires.

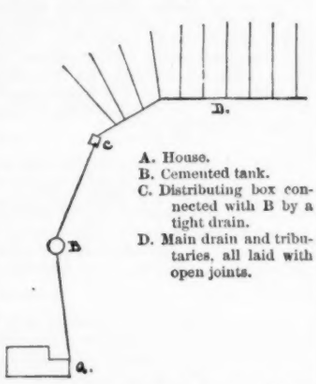
Where there is land, even of small amount, the best system is that suggested by Mr. Moule, the inventor of the earth-closet, to "Divide and Conquer." This system, which is called *subsoil irrigation*, has now been used sufficiently long, and is sufficiently introduced and recommended by the highest sanitary authorities, to make it entirely safe to recommend its adoption. Its simplicity and cheapness, and the small amount of care that it requires, commend it to general attention. The amount of land needed for its application is by no means large. Two hundred square feet will be quite sufficient for an ordinary household, though there are certain advantages in extending the area, where circumstances allow. Indeed, by the use of a vigorous vegetation, especially the sunflower, the Jerusalem artichoke, or the common grape, it will be possible to get on with much less than the area specified. Only sufficient inclination of the surface is required to secure a flow in the drains; and one foot in one hundred feet will be fall enough to accomplish this, especially where the flush-tank is used. The application of the system is as follows: —

Let the tight drain deliver into a tightly cemented small cistern, say four feet by four feet, discharging through a bent overflow pipe, of which the outlet is twelve inches below the point at which it leaves the wall of the cistern (near its top). This will



secure room for the deposit of solid matter at the bottom, and for the floating of scum at the top. Once or twice a year it may be necessary to clean out the solid accumulation at the bottom, which is always worth the cost of removal. The outlet should be not more than about twelve inches below the surface of the ground, and should be continued through open jointed, land-drain tiles, — say, two inches in diameter, — laid on a foundation of narrow boards, or of inverted horse-shoe tiles, also open-jointed, and nowhere more than about twelve inches below the surface. This drain may be continued, or it may be the main for any number of longer or shorter branches; the whole system acting as a means for conveying the foul liquid to all parts of the area used for irrigation, and delivering it at a point within the reach of the roots of plants. It would probably be best, where a single long line is not sufficient, to lay the lateral drains about four feet apart.

It will depend on the degree to which the grease-trap and the tight cistern withhold solid matters, whether the drain will require cleansing at long or short intervals. The writer found his own irrigation drains — arranged as here shown — to work perfectly for five years. They were then cleansed and relaid at a cost of less than five dollars. The chief advantage of the boards or the horse-shoe tiles is to afford a true bed that will facilitate the taking up and relaying when the cleansing is done.



A. House.
B. Cemented tank.
C. Distributing box connected with B by a tight drain.
D. Main drain and tributaries, all laid with open joints.

In cleaning, it is only necessary to open from the upper end to a point where the drain has junctions that are found to be quite clear.

By this simple process, liquid matter of the foulest and most dangerous character is distributed thinly and evenly through earth that is occupied by the roots of plants, and that is constantly permeated by the atmospheric air on which it depends for its oxidizing and disinfecting properties.

Means having been secured for the cleansing of the drain by regular flushing, or by the use of a wire, or in whatever way may seem best, and all danger of the leaching-away into the soil near the house or well of the contents of this drain being avoided, our next attention should be given to the disinfecting of the air of the drain itself, and to preventing the ingress of this air into the house. The great disinfectant under all such circumstances is common air; and there is no way in which we can so well secure ourselves against the production of dangerous gases in a drain, as by the establishment of a free current of air within it. In this work, as in almost every thing else, the simplest way is the best way. When the drain runs only from the kitchen sink, a separate air-pipe should be carried from its house end well above the top of the house (not near to the top of a chimney nor to a window), and be furnished at its upper end with a ventilating cowl that will tend to keep up a good current. There should be some means for admitting fresh air at the outer, or cistern end of the drain, to supply the current. Where there are plumbing works within the house, the drain may be connected directly with the soil-pipe; and *no trap of any sort* should be used in its course, but the soil-pipe should be continued of its full size out through the top of the house, and be furnished with a ventilating cowl. There will then be no trap in the course of the pipe to arrest solid matters, and hold them for decomposition; and there will be a steady current of fresh air sufficient to prevent the poisonous decomposition of the refuse matter contained in the pipe or drain. If this were deprived of sufficient air, it would enter into a state of putrefaction that would be likely to evolve dangerous gases. The supply of air to the lower end of the drain may come from the sewer or from the cistern *if these are well ventilated*. If there is no sufficient ventilation of these, then there should be a trap near the lower end of the drain, and an inlet for fresh air into the drain above it. In cold climates this inlet should be by a small pipe (say, one and one-half inches diameter), and it should run under ground for a sufficient distance to become somewhat warmed.

To sum up, the leading principles to be followed are these: to carry the refuse matters from the house, through an absolutely tight drain, to a tight cistern where their organic parts will rise to the surface, and where any heavy matter contained will settle at the bottom; to make the outlet from this cistern from a point between the scum and the sediment, where only liquid will be supplied; to discharge this matter into open-jointed drains extending through such an area of soil as will prevent the concentration at any point of enough liquid to filter away into the subsoil, and at a point so near the surface that it will be subjected to the disinfecting action of the soil and of vegetation; to furnish, in all cases, a direct current of fresh air through the drain; and, when a soil-pipe is used, to continue the direct current through this latter also.

Drain-traps — what are commonly known as drain-traps — would be better named "man-traps."

If the necessary other means are adopted to prevent the ingress of foul air into houses, then it is very well to use immediately under the outlets of wash-basins, sinks, etc., some form of water-seal trap, which shall be to a certain extent a barrier against bad smells generated immediately within the waste-pipe; but, as a main dependence, these traps are a delusion and a snare.

The bell-trap so often used over the outlet pipe of the kitchen sink, &c., is in every way defective. Its movable part is very easily taken off, and is very apt to be left off; and, even when it is in place, it offers such a very slight resistance to the pressure of foul air as to be at all times insufficient, and quite generally to be, as a trap, simply nothing at all.

The great objections to all water-seal traps are, first, that the resistance they offer to the pressure of sewer-gas is so slight, that a trifling change in the temperature of a sewer or cesspool, the sudden filling of the sewer with water during heavy storms, or even the influence of a strong wind blowing against its outlet or sucking strongly at a chimney-flue, will suffice to open them; and, second, that water is a very imperfect disinfecting barrier. Fresh water in a trap may for a few moments absorb all the foul gases presented to it; but, accompanying the absorption at the sewer end, there is too often — almost always — a giving-off at the house end. As soon as the water is saturated with gas, and sometimes even before this, there is a rapid delivery of gas at the house end of the trap. Careful experiments have shown that carbonate of ammonia exposed at the sewer end of a trap will produce its chemical reaction on colored litmus paper exposed at the house end within fifteen minutes; and that even the heavier and more poisonous gases so commonly produced in foul drains are all transmitted in their full force within a very short time, — even suffi-

ciently to produce the corrosion of metals exposed at the house end.

The real and effective drain-trap is the same as the real and most effective disinfectant, — a free circulation of common air. Safety is to be sought, not through a shutting-out of the foul gases formed in the sewer and drain; but in the prevention of their formation, by the free admission and circulation of air. This being secured, there is little to be apprehended, if the ordinary bent tube filled with water is used as a trap in branch pipes, in such a way as to prevent the too rapid transmission of such odors as may still be formed in the pipe. If there is no sufficient ventilation of pipes and sewers, it is madness to suppose that we can live safely in rooms which are protected from the invasion of poisonous gases, only by water-seal traps.

NOTES AND CLIPPINGS.

STATUE OF LIBERTY. — The casting of the immense bronze statue of Liberty, which is to be erected at the entrance of New York Harbor, has been going on for some time near the French capital. The shoulders are more than thirty-nine feet broad, and the head twenty-one feet in height from the chin to the top, while the legs measure several yards in circumference. A man can conceal himself easily in many of the folds of the drapery; and the light which the statue holds in its hand is so large that two persons can walk around it, and pass each other. The arms and hands were brought to New York lately by the steamer *L'Amérique*. Some months ago, when the project was first spoken of, a wealthy manufacturer of Paris called on M. Laboulaye, President of the Executive Committee, and inscribed his name as one of the subscribers, without specifying the amount of his contribution. M. Bartholdi, who was present at the time, and who knew the liberality of the subscriber, jokingly remarked, that as he knew M. X—— to be a strong Republican, and a great admirer of America, the amount of his subscription would certainly be very large, if it was in proportion to his admiration for the Great Republic.

"Let it be so, then," answered the manufacturer; "and I engage myself to furnish all the bronze necessary for the casting of the statue."

"But are you aware," answered M. Bartholdi, astonished, "that your subscription will then reach the enormous sum of one hundred thousand francs?"

"Very well, sir; let that be the amount of my subscription, and I shall impose only one condition: I desire my name to be kept secret in relation to this affair, and you can draw on my banker as soon as you please for the amount."

JERSEY CITY. — An exchange states that one of the walls of the new City Hall, Jersey City, is sinking, and threatens to destroy the building.

GLASS. — The National Glass Company of Bellcaire, O., have been experimenting with M. de la Bastie's method of toughening glass. They have succeeded in producing glass of such strength that a common lamp-chimney made of it has been successfully used as a hammer in driving an eight-penny nail through a board an inch and a half thick.

FLAGSTONE. — A stone passed through Indianapolis from the Greensburg quarries to the Centennial, which was twenty feet eight inches long, ten feet four inches wide, and six feet thick, containing two hundred and thirteen and a half superficial feet. This is probably the largest flagstone ever shipped in the State.

LIGHTHOUSE. — The Dhu Heartach Lighthouse has been recently completed upon a rock off the western coast of Scotland, fourteen miles from land. The light is built upon a trap-rock two hundred and forty feet long and one hundred and thirty feet broad, which rises about thirty-five feet above high-water mark. The tower is in form a parabolic frustum, surmounted by a plain cavetto, abacus, and parapet, the upper course of which is 107½ feet above the foundation. The doorway is thirty-two feet above the foundation. 3,115 tons of granite have been used in the construction, 1,840 of these tons being used for the solid base; the stones being laid in Portland cement, and joggled together with cast and malleable iron joggles. Work was begun in 1867; but, owing to the extreme difficulty of effecting landings, little was accomplished; in 1868 landings were effected only on thirty-eight days, and, in 1869, upon sixty days. Early in June, 1869, the first courses of the foundations were laid; but, even though cemented and joggled, a gale detached more than a dozen stones, each weighing over two tons, although they were at a height of more than thirty-five feet above high-water mark. All the cutting and fitting was done on shore; and the stones, when properly fitted, were placed upon lighters, and towed out to the rock. In 1870, landings were effected on sixty-two days, and, in 1871, on thirty-seven only. In 1872, the building was completed, and the light put in: this is one hundred and forty-five feet above the sea, and can be seen from a distance of eighteen nautical miles. The cost of the lighthouse, exclusive of the other buildings on the mainland, was more than $357,000.

THE RIGHT TO DRAWINGS. — Recently a builder sued an architect in the Sheriff's Court, Glasgow, to recover the working-drawings and calculations for a building erected by the plaintiff, and for which the defendant had been paid. The architect pleaded the custom of the profession, that the architect has a right to all drawings, and introduced evidence to that effect. The sheriff ruled that the custom had not been proven, and ordered the immediate delivery of the drawings to the plaintiff.

SOUTH KENSINGTON MUSEUM. — Lord Sandon recently stated in the House of Commons, that the general plan for completing South Kensington Museum had been agreed upon, and that the first work undertaken would be the Art Educational Library, which was at present in an overcrowded and unhealthy condition.

BRISTOL. — The Chapter of Bristol Cathedral have adopted a resolution carrying out the idea of the Dean, that the Chapter shall superintend the completion of the nave of the cathedral.

ELY. — Sir G. G. Scott's designs for the restoration of the octagon and lantern of Ely Cathedral have been provisionally approved.

HYGIENIC BURIAL. — Very few reformers are willing to practise what they preach; but the Earl of Essex is one of these few. For a long time he has been laboring to induce the English people to abandon the time-honored manner of burial, and substitute for it a burial more in accordance with the laws of nature and with hygienic principles. Last year, he opened to the public an exhibition of coffins, caskets, &c., prepared by his directions in such manner as to insure the direct access of earth to the body. These coffins were mostly made of wicker-work. Those who attended the exhibition were in great part undertakers, who came simply out of curiosity, and could hardly be expected to favor the introduction of a system which would do away with rosewood caskets, carved, inlaid, and ornamented with heavy silver plating, and for which they receive such enormous prices. But the earl is sincere in his endeavors, and has set the example by burying his wife in a plain pine casket, perforated with holes which will admit the healthful action of the earth.

THE LOUVRE. — The newly-acquired Gate of Cremona is to be placed in the Louvre, between the *Salle Michel Ange* and the *Salle Michel Colomb*. Right and left of it are to be placed the Slaves of Michael Angelo.

ROUEN. — The Municipal Council of Rouen have voted one million three hundred thousand francs for the erection of a museum-building, which shall also contain the library.

THE PARIS SALON. — The architectural exhibition in this year's *salon* is contained in seventy-six frames.

MUNICH. — An interesting art exhibition is to be held in Munich during the coming summer. It will consist exclusively of works illustrative of German art and artistic industry. The collection of works by the older masters will be arranged so as to illustrate historically the development of art in Germany, and the discoveries by Germans who have laid the foundations of artistic workmanship.

SOUNDING-BOARDS. — In many large churches and halls of bad acoustic properties, where sounding-boards have been unsuccessfully introduced, the failure has been owing to the form and situation of the individual sounding-board used, and does not prove that a proper sounding-board would not remedy the defect. In a large church at Montreal, Can., which is noted for the ease with which a speaker can be heard in it, the sounding-board used is a simple horizontal ceiling of polygonal form, suspended not more than two feet above the head of the speaker. It is built of heavy oak, and projects ten or twelve feet on each side of the speaker. It is this form of sounding-board that is commonly used in cathedral churches in Europe, — churches which were not originally intended for speaking, and in which the voice would be lost in the vaults if it were not for the use of a sounding-board. In some of these churches which are provided with fixed seats and stalls, the last row of seats is provided with a strong oak partition, from the top of which projects towards the speaker a hood or sounding-board, six feet or more in depth; listeners in this back row of seats can hear much better than those in many of the seats nearer the speaker. At the New York Crystal Palace, some twenty-five years ago, an attempt was made to remedy the acoustic defect of the auditorium by the use of a horizontal sounding-board of polygonal form. That the attempt was a failure must not be attributed to the form of the sounding-board, but rather to the material of which it was composed. It was built by the Messrs. Hall & Sons, piano-makers, and the wood used was the thin and resonant wood used for making the sounding-boards of pianos; so that instead of reflecting the sound, as it was intended to do, and as heavier wood would have done, it absorbed it into its own mass, and vibrated with the air.

WOODEN DOWELS. — In the ancient Egyptian temples, stones have been found tied together by a kind of dowel of wood on their upper surfaces, and these wooden ties, of dovetail form, were inserted about an inch deep. Some of these have been found quite sound in temples known to be at least four thousand years old. The ties are said to be the tamarisk or Shittim wood, of which the ark was constructed, and which was a sacred tree in ancient Egypt, though now very rarely found.

SALT WOOD. — It is a curious fact, that in the salt-mines of Poland and Hungary the galleries are supported by wooden pillars, which are found to last unimpaired for ages, in consequence of being impregnated with the salt, while pillars of brick and stone, used for the same purpose, crumble away in a short time by the decay of their mortar. It is also found that wooden piles driven into the mud of salt flats and marshes last for an unlimited time, and are used for the foundation of brick and stone edifices; and the practice of docking timber by immersing it for some time in sea-water, after it has been seasoned, is generally admitted to be promotive of its durability. There are some experiments which appear to show that, even after the dry-rot has commenced, immersion in salt water effectually checks its progress, and preserves the remainder of the timber.